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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,704	03/29/2005	Keiichi Nakao	043890-0727	2023

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EXAMINER	
BAISA, JOSELITO SASIS	
ART UNIT	**PAPER NUMBER**
2832	
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12/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,704	NAKAO ET AL.	
	Examiner	Art Unit	
	Joselito Baisa	2832	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 13-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,13-27 and 30* is/are rejected.

7)☐ Claim(s) *28 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. The rejection of 35 USC 112, 2nd paragraph on Claim 1 has also been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-14, 16, 18, 22-26, and 30 as being best understood are rejected under 35 U.S.C. 102(b) as being anticipated by Ratell et al. (US 5,867,886).

Ratell et al shows all features of the claimed invention including a load sensor 18 (shown in Figure 3) comprising: a flexible metal substrate or diaphragm 26; a glass layer 28, 38 (column 6, lines 5-11 and line 55, i.e., at least the dielectric layer 28 formed from the glass dielectric ink or film) provided on the substrate 26; an internal wiring contact or electrode 36 provided on the glass layer 28, 38; an adjusting layer 38 provided on the glass layer 28; and a strain-sensitive resistor element 34 (column 5, lines 66-67, i.e., allowed strains to be transmitted and column 6, line 65, i.e., in the form of the pattern) provided on the adjusting layer 38 and connected to the wiring 36, wherein a thermal expansion coefficient of the adjusting layer 38 is closer to the thermal expansion coefficient of the strain-sensitive resistor element 34 (or equivalently,

thermal expansion coefficient of the adjusting layer is the same to a thermal expansion coefficient of the strain-sensitive resistor element than to a thermal expansion coefficient of the glass layer) as set forth also at column 5, line 56 to column 6, line 20 (i.e., each thick film dielectric layer must withstand the strains induced as the substrate 26 deflects while transmits the strains (or thermal expansion coefficient) to the element 34 at a level proportional to the strain in the substrate 26 and provides the thermal expansion coefficient that approximately equals that of the substrate 26), wherein the glass layer 28 includes crystallized glass such as porcelain, quartz, SiO2 (column 6, lines 13-14), as the thermal expansion coefficients are kept approximately the same among the layers 28,38,34, the difference in such thermal expansion coefficients between the layers 28,38,34 is almost zero or less than zero, where it meets the limitations of claims 4-7 (i.e., a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the strain-sensitive resistor element is not less than $10x10^{-7}$/°C and is less than $50x10^{-7}$/°C (claim 4), or a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the glass layer is less than $20x10^{-7}$/°C (claim 5), or a difference between the thermal expansion coefficient of the strain-sensitive resistor element and the thermal expansion coefficient of the adjusting layer is less than $20x10^{-7}$/°C (claim 6)), each of the strain-sensitive resistor element 34 and the adjusting layer 38 has a thickness which is not smaller than lμm and is smaller than 500μm as set forth at column 5, lines 27-28(i.e., each is about 25 μm which meets both claims 7 and 11-12), the adjusting layer 38 has an area which is not smaller than 0.1mm x 0.1 mm and is smaller than 50mm x 50 mm (column 5, lines 53-55, i.e., the same diameter with the substrate 26 which is of about 4 to about 20mm, where 20mm x 20mm is clearly within the claimed range), wherein the adjusting layer 38 has an

area larger than an area of the strain-sensitive resistor element 34 and the wiring contact 36 includes a portion provided on the adjusting layer 38 as clearly shown in Figure 3, the glass layer has a thickness of about 25pm as set forth earlier at column 5, lines 27-28 which is within the recited range of not smaller than 10pm and is smaller than 500μm (meet claim 13). As shown in Figure 3, the resistor element 34 has an area which is at least smaller than the both the adjusting and glass layers 38, 28 where such area as early described at column 5, lines 53-55, is not smaller than 0.1 mm x 0.1 mm and is smaller than 50mm x 50 mm, in which it meet claim 14 (i.e., an area which is not smaller than $0.01mm^2$ and is smaller than 2,500mm2), wherein the substrate 26 comprises metal plate die-cut with a mold to have a predetermined shape (such as a monolithic metal structure by either conventional stamping or machining techniques as set forth at column 4, lines 53-55, meet claim 16).

Regarding the method claims 22-26 and 30, Ratell et al further shows the adjusting layer 38 can be formed by applying a glass paste onto the glass layer 28 and firing the applied glass pasted (column 6, lines 55-61), a protective layer or cap including connector 16 (as shown in Figure 1) is formed to cover the resistor element 34 and respective portions of the wiring electrodes 36, where the substrate 26 has a thickness not smaller than 1 mm (column 5, lines 52-53, meet claim 24). Regarding claims 25-26, Ratell et al further discloses at column 6, line 57 that the formed device including the resistor element 34 (which is formed by firing the resistor paste) and the glass layer 28, the adjusting layer 38 are fired at the temperature of about 850°C (i.e., firing the paste) which is within the recited range of not lower than 400°C and lower than 1000°C or ranging from 400°C to 900°C.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15, 17, 19-21, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ratell et al.

Ratell et al discloses all features of the claimed invention as set forth above except for calling the thermal expansion coefficient of the metal substrate is within the range of $80x10^{-7}$/°C to $200x10^{-7}$/°C (as set forth in claim 15), the gauge factor of the resistor element is within 10 to 1,000 (as noted in claim 17), the adjusting layer comprises composite glass including 5wt% to 40wt% of ceramic filler which comprises ceramic powder having particle diameter within the rage of 0.01 μm to 10μm, the ceramic filler comprises at least one of alumina, zirconia, magnesia, titania, barium titanate, and calcia. Ratell et al discloses that the materials used to the adjusting layer and the glass layer would include aluminum oxide or alumina (column 2, lines 3-6 and column 6, lines 5-20) where suitable mixtures of metal oxides, ceramic materials, bonding agents, and ink compositions or possible commercially materials can be used as long when subjecting to firing, such materials will provide the thermal expansion coefficient the same among the layers. Depend upon the desired flexibility, adherence, withstanding strains or pressures applied to the metal substrate of the sensor, the thermal expansion coefficient of the metal substrate can be chosen differently, the resistor gauge can be chosen different for each

desired strain, the wt% of the ceramic filler and its particle diameter can be chosen depend upon the desired thermal expansion and flexibility requirement. Inasmuch, such choices would be within the purview of obviousness to Ratell et al as well as to one having ordinary skill in the art at the time the invention was made.

Allowable Subject Matter

Claims 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not suggest the use of a glass paste that comprises: dispersing ceramic powder in solvent and binder as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and dispersing glass powder in the solvent and the binder including the ceramic powder dispersed therein to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises (as recited in claim 28) or dispersing ceramic powder in solvent and dispersant as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and dispersing glass powder in the solvent and the dispersant including the ceramic powder dispersed therein as to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises(as recited in claim 29).

Response to Argument

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim 1 recites "...wherein a thermal expansion coefficient of the adjusting layer is closer to a thermal expansion coefficient of the strain-sensitive resistor element than to a thermal expansion coefficient of the glass layer".

The reference Ratell discloses on Col. 6, Lines 14-21, the dielectric layer 38 (adjusting layer, ESL 4913B) to be compatible with piezoresistor 34 (strain-sensitive resistor, ESL 3414B). Electro Science, the manufacturer of these particular materials used by Ratell for his invention, has provided the particular thermal expansion coefficient for each of these materials mentioned.

The adjusting layer, ESL 4913B has a thermal expansion coefficient of 8ppm/°C

the strain-sensitive resistor, ESL 3414B has 8 ppm/°C

and the glass layer, ESL 4914 has 11 ppm/°C

Base on these datas, it is therefore concluded that Ratell reference has a thermal expansion coefficient of the adjusting layer closer to a thermal expansion coefficient of the strain-sensitive resistor element than to a thermal expansion coefficient of the glass layer.

Electro Science can be contacted at (610) 272-8000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joselito Baisa whose telephone number is (571) 272-7132. The examiner can normally be reached on M-F 5:30 am to 2:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joselito Baisa
Examiner
Art Unit 2832

jsb

ELVIN LUSO
SUPERVISORY PATENT EXAMINER
12/10/07